DOCUMENT RESUME

ED 322 008 SE 051 522

AUTHOR Hembree, Ray
TITLE Bibliography of Research on Mathematical Problem Solving.
PUB DATE Jul 90
NOTE 45p.
PUB TYPE Reference Materials - Bibliographies (131)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Cognitive Processes; College Mathematics; *Critical Thinking; Elementary School Mathematics; Elementary Secondary Education; Higher Education; Learning Strategies; Literature Reviews; Mathematics Education; Periodicals; *Problem Solving; Secondary School Mathematics
IDENTIFIERS *Mathematics Education Research

ABSTRACT

This bibliography identifies reports of inferential research on problem solving in mathematics. The listing was developed for use in a synthesis of the research performed by meta-analysis. Guidelines for including studies were applied as follows: (1) the report provided product-moment correlation coefficients and their sample sizes or, in the case of experiments, sufficient data for effect-size calculations; (2) data measurements were made with validated instruments; (3) experiments used at least two groups for comparison purposes; and (4) each group contained at least 10 subjects (for rigor in tests of homogeneity during data analysis). The reports are listed alphabetically by author in four categories: journal articles; doctoral dissertations; documents available through the Educational Resources Information Center (ERIC); and other sources. (Author/CW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED322008

BIBLIOGRAPHY OF RESEARCH ON MATHEMATICAL PROBLEM SOLVING

Ray Hembree, Adrian College

July, 1990

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Ray Hembree

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

SE051522

BIBLIOGRAPHY OF RESEARCH ON MATHEMATICAL PROBLEM SOLVING

Journal Articles

Anand, P., & Ross, S. (1987). Using computer-assisted instruction to personalize arithmetic materials for elementary school children. Journal of Educational Psychology, 79, 72-78.

Anthony, B., & Hudgins, B. (1978). Problem-solving processes of fifth grade arithmetic pupils. Journal of Educational Research, 72, 63-67.

Armstrong, J. (1981). Achievement and participation of women in mathematics: Results of two national surveys. Journal for Research in Mathematics Education, 12, 356-372.

Arter, J., & Clinton, L. (1974). Time and error consequences of irrelevant data and question placement in arithmetic word problems II: Fourth graders. Journal of Educational Research, 68, 28-31.

Babad, E., & Bashi, J. (1978). On narrowing the performance gap in mathematical thinking between advantaged and disadvantaged children. Journal for Research in Mathematics Education, 9, 323-333.

Balow, I. (1964). Reading and computation ability as determinants of problem solving. Arithmetic Teacher, 11, 18-22.

Bana, J., & Nelson, D. (1977). Some effects of distractions in nonverbal mathematics problems. Alberta Journal of Educational Research, 23, 268-279.

Bana, J., & Nelson, D. (1978). Distractors in nonverbal mathematical problems. Journal for Research in Mathematics Education, 9, 55-61.

Banghart, F., McLaulin, J., Wesson, J., & Pikaart, L. (1963). An experimental study of programmed versus traditional elementary school mathematics. Arithmetic Teacher, 10, 199-204.

Barton, W., Jr. (1926). The effect of group activity in developing ability to solve problems in first year algebra. Educational Administration and Supervision, 12, 512-518.

Bassler, O., Beers, M., & Richardson, L. (1975). Comparison of two instructional strategies for teaching the solution of verbal problems. Journal for Research in Mathematics Education, 6, 170-177.

Bell, E., & Bell, R. (1985). Writing and mathematical problem solving: Arguments in favor of synthesis. School Science and Mathematics, 85, 210-221.

Berglund-Gray, G., & Young, R. (1940). The effects of process sequence on the interpretation of two-step problems in arithmetic. Journal of Educational Research, 34, 21-29.

Bilsky, L., & Judd, T. (1986). Sources of difficulty in the solution of verbal arithmetic problems by mentally retarded and nonretarded individuals. American Journal of Mental Deficiency, 90, 395-402.

Blackwell, R., Galassi, J., Galassi, M., & Watson, T. (1985). Are cognitive assessment methods equal? A comparison of think aloud and thought listing. Cognitive Therapy and Research, 9, 399-413.

Blume, G., & Schoen, H. (1988). Mathematical problem-solving performance of eighth-grade programmers and nonprogrammers. Journal for Research in Mathematics Education, 19, 142-156.

Bowman, H. (1932). The relation of reported preference to performance in problem solving. Journal of Educational Psychology, 23, 266-276.

Bramhall, E. (1939). An experimental study of two types of arithmetic problems. Journal of Experimental Education, 8, 36-38.

Buckingham, G. (1937). The relationship between vocabulary and ability in first year algebra. Mathematics Teacher, 30, 76-79.

Burns, P., & Yonally, J. (1964). Does the order of presentation of numerical data in multi-step arithmetic problems affect their difficulty? School Science and Mathematics, 64, 267-270.

Caldwell, J., & Goldin, G. (1979). Variables affecting word problem difficulty in elementary school mathematics. Journal for Research in Mathematics Education, 10, 323-336.

Caldwell, J., & Goldin, G. (1987). Variables affecting word problem difficulty in secondary school mathematics. Journal for Research in Mathematics Education, 18, 187-196.

Call, R., & Wiggin, N. (1966). Reading and mathematics. Mathematics Teacher, 59, 149-157.

Cathcart, W., & Liedtke, W. (1969). Reflectiveness, impulsiveness and mathematics achievement. Arithmetic Teacher, 16, 563-567.

Charles, R., & Lester, F., Jr. (1984). An evaluation of a process-oriented instructional program in mathematical problem solving in Grades 5 and 7. Journal for Research in Mathematics Education, 15, 15-34.

Chase, C. (1960). The position of certain variables in the prediction of problem-solving in arithmetic. Journal of Educational Research, 54, 9-14.

Chase, C. (1961). Formal analysis as a diagnotic technique in arithmetic. Elementary School Journal, 61, 282-286.

Clark, J., & Vincent, E. (1925). A comparison of two methods of arithmetic problem analysis. Mathematics Teacher, 18, 226-233.

Cohen, S., & Stover, G. (1981). Effects of teaching sixth-grade students to modify format variables of math word problems. Reading Research Quarterly, 16, 175-199.

Cope, D., & Murphy, A. (1981). The value of strategies in problem solving. Journal of Psychology, 107, 11-16.

Darch, C., Carnine, D., & Gersten, R. (1984). Explicit instruction in mathematics problem solving. Journal of Educational Research, 77, 351-359.

Days, H., Wheatley, G., & Kulm, G. (1979). Problem structure, cognitive level, and problem-solving performance. Journal for Research in Mathematics Education, 10, 135-146.

De Corte, E., Verschaffel, L., & De Win, L. (1985). Influence of rewording verbal problems on children's problem representations and solutions. Journal of Educational Psychology, 77, 460-470.

Dickey, J. (1934). The value of estimating answers to arithmetic problems and examples. Elementary School Journal, 35, 24-31.

Drake, R. (1940). The effect of teaching the vocabulary of algebra. Journal of Educational Research, 33, 601-610.

Ehindero, O. (1982). Correlates of sex-related differences in logical reasoning. Journal of Research in Science Teaching, 19, 553-557.

Engelhart, M. (1932). The relative contribution of certain factors to individual differences in arithmetical problem solving ability. Journal of Experimental Education, 1, 19-27.

Erickson, L. (1958). Certain ability factors and their effects on arithmetic achievement. Arithmetic Teacher, 5, 287-293.

Faulk, C., & Landry, T. (1961). An approach to problem-solving. Arithmetic Teacher, 8, 157-160.

Fayol, M., Abdi, H., & Gombert, J. (1987). Arithmetic problems formulation and working memory load. Cognition and Instruction, 4, 187-202.

Fennema, E., & Sherman, J. (1978). Sex-related differences in mathematics achievement and related factors: A further study. Journal for Research in Mathematics Education, 9, 189-203.

Fennema, E., & Tartre, L. (1985). The use of spatial visualization in mathematics by girls and boys. Journal for Research in Mathematics Education, 16, 184-206.

Flaherty, E. (1975). The thinking aloud technique and problem solving ability. Journal of Educational Research, 68, 223-225.

Foran, T., & Weber, M. (1939). An experimental study of the relation of homework to achievement in arithmetic. Mathematics Teacher, 32, 212-214.

Forsyth, R., & Ansley, T. (1982). The importance of computational skill for answering items in a mathematics problem-solving test: Implications for construct validity. Educational and Psychological Measurement, 42, 257-263.

Forsyth, R., & Spratt, K. (1980). Measuring problem solving ability with multiple-choice items: The effect of item format on selected item and test characteristics. Journal of Educational Measurement, 17, 31-43.

Frandsen, A., & Holder, J. (1969). Spatial visualization in solving complex verbal problems. Journal of Psychology, 73, 229-233.

Freyberg, P. (1966). Concept development in Piagetian terms in relation to school achievement. Journal of Educational Psychology, 57, 164-168.

Greene, H. (1925). Directed drill in the comprehension of verbal problems in arithmetic. Journal of Educational Research, 11, 33-40.

Grouws, D. (1972). Open sentences: Some instructional considerations from research. Arithmetic Teacher, 29, 595-599.

Hall, J. (1947). Solving verbal arithmetic problems without pencil and paper. Elementary School Journal, 48, 212-217.

Hanna, P. (1930). Methods of arithmetic problem solving. Mathematics Teacher, 23, 442-450.

Hansen, C. (1944). Factors associated with successful achievement in problem solving in sixth grade arithmetic. Journal of Educational Research, 38, 111-118.

Hatfield, L., & Kieren, T. (1972). Computer-assisted problem solving in school mathematics. Journal for Research in Mathematics Education, 3, 99-122.

Hebbeler, K. (1977). Young children's addition. Journal of Children's Mathematical Behavior, 1, 108-121.

Hiebert, J. (1982). The position of the unknown set and children's solutions of verbal arithmetic problems. Journal for Research in Mathematics Education, 13, 341-349.

Hiebert, J., Carpenter, T., & Moser, J. (1982). Cognitive development and children's solutions to verbal arithmetic problems. Journal for Research in Mathematics Education, 13, 83-98.

Hilton, T., & Berglund, G. (1974). Sex differences in mathematics achievement--A longitudinal study. Journal of Educational Research, 67, 231-237.

Hudgins, B. (1960). Effects of group experience on individual problem solving. Journal of Educational Psychology, 1, 37-42.

Ibarra, C., & Lindvall, C. (1982). Factors associated with the ability of kindergarten children to solve simple arithmetic story problems. Journal of Educational Research, 75, 149-155.

Irish, E. (1964). Improving problem solving by improving verbal generalization. Arithmetic Teacher, 11, 169-175.

Isaacs, I. (1987). Using problem solving teaching styles to prepare candidates for the CXC basic proficiency examinations. Educational Studies in Mathematics, 18, 177-190.

Jerman, M. (1973). Individualized instruction in problem solving in elementary school mathematics. Journal for Research in Mathematics Education, 4, 6-19.

Jerman, M., & Mirman, S. (1974). Linguistic and computational variables in problem solving in elementary mathematics. Educational Studies in Mathematics, 5, 317-362.

John, L. (1930). Difficulties in solving problems in arithmetic. Elementary School Journal, 31, 202-215.

Johnson, D., & Harding, R. (1979). University level computing and mathematical problem-solving ability. Journal for Research in Mathematics Education, 10, 37-55.

Johnson, D., Skon, L., & Johnson, R. (1980). Effects of cooperative, competitive, and individualistic conditions on children's problem-solving performance. American Educational Research Journal, 17, 83-93.

Johnson, H. (1944). The effect of instruction in mathematical vocabulary upon problem solving in arithmetic. Journal of Educational Research, 38, 97-110.

Johnson, J. (1949). On the nature of problem solving in arithmetic. Journal of Educational Research, 43, 110-115.

Klugman, S. (1944). Cooperative versus individual efficiency in problem-solving. Journal of Educational Psychology, 35, 91-100.

Knifong, J., & Holtan, D. (1976). An analysis of children's written solutions to word problems. Journal for Research in Mathematics Education, 7, 106-112.

Koch, E., Jr. (1965). Homework in arithmetic. Arithmetic Teacher, 12, 9-13.

Kulm, G., Lewis, J., Omari, I., & Cook, H. (1974). The effectiveness of textbook, student-generated, and pictorial versions of presenting mathematical problems in ninth-grade algebra. Journal for Research in Mathematics Education, 5, 28-35.

Lee, K. (1982). Fourth graders' heuristic problem-solving behavior. Journal for Research in Mathematics Education, 13, 110-123.

Lemoyne, G., & Tremblay, C. (1986). Addition and multiplication: Problem solving and interpretation of relevant data. Educational Studies in Mathematics, 17, 97-123.

Lerch, H. & Hamilton, H. (1966). A comparison of a structured-equation approach to problem solving with a traditional approach. School Science and Mathematics, 66, 241-246.

Lucas, J. (1974). The teaching of heuristic problem-solving strategies in elementary calculus. Journal for Research in Mathematics Education, 5, 36-46.

Lueck, V. (1948). An experiment in writing algebraic equations. Journal of Educational Research, 42, 132-137.

Machida, K., & Carlson, J. (1984). Effects of a verbal mediation strategy on cognitive processes in mathematical learning. Journal of Educational Psychology, 76, 1382-1385.

Maertens, N. (1969). An analysis of the effects of arithmetic homework upon the arithmetic achievement of third-grade pupils. Arithmetic Teacher, 16, 383-389.

Maertens, N., & Johnston, J. (1972). Effects of arithmetic homework upon the attitudes and achievement of fourth, fifth and sixth grade pupils. School Science and Mathematics, 72, 117-126.

Maier, N., & Casselman, G. (1970). The SAT as a measure of problem-solving ability in males and females. Psychological Reports, 26, 927-939.

Mandell, A. (1980). Problem-solving strategies of sixth-grade students who are superior problem solvers. Science Education, 64, 203-211.

Mayer, R. (1982). Memory for algebra story problems. Journal of Educational Psychology, 74, 199-216.

Meltzer, L. (1982). Visual perception: Stage One of a long-term investigation into cognitive components of achievement. British Journal of Educational Psychology, 52, 144-154.

Meyer, R. (1978). Mathematical problem-solving performance and intellectual abilities of fourth-grade children. Journal for Research in Mathematics Education, 9, 334-348.

Meyer, R. (1981). Intellectual abilities that discriminate good and poor problem solvers. Journal for Research in Mathematics Education, 12, 156-159.

Milton, G. (1957). The effects of sex-role identification upon problem-solving skill. Journal of Abnormal and Social Psychology, 55, 208-212.

Mitchell, C. (1929). The specific type of problem in arithmetic versus the general type of problem. Elementary School Journal, 29, 594-596.

Mitchell, C. (1932). Problem analysis and problem-solving in arithmetic. Elementary School Journal, 32, 464-466.

Monroe, W., & Englehart, M. (1933). The effectiveness of systematic instruction in reading verbal problems. Elementary School Journal, 33, 377-381.

Morales, R., Shute, V., & Pellegrino, J. (1985). Developmental differences in understanding and solving simple mathematics word problems. Cognition and Instruction, 2, 41-57.

Morton, R. (1925). An analysis of errors in the solution of arithmetic problems. Educational Research Bulletin (April), Ohio State University.

Moyer, J., Moyer, M., Sowder, L., & Threadgill-Sowder, J. (1984). Story problem formats: Verbal versus telegraphic. Journal for Research in Mathematics Education, 15, 64-68.

Moyer, J., Sowder, L., Threadgill-Sowder, J., & Moyer, M. (1984). Story problem formats: Drawn versus verbal versus telegraphic. Journal for Research in Mathematics Education, 15, 342-351.

Muth, K. (1984). Solving arithmetic word problems: Role of reading and computational skills. Journal of Educational Psychology, 76, 205-210.

Myers, J., Hansen, R., Robson, R., & McCann, J. (1983). The role of explanation in learning elementary probability. Journal of Educational Psychology, 75, 374-381.

Nesher, P. (1976). Three determinants of difficulty in verbal arithmetic problems. Educational Studies in Mathematics, 7, 369-388.

Overholt, E. (1965). A Piagetian conservation concept. Arithmetic Teacher, 12, 317-326.

Owen, E., & Sweller, J. (1985). What do students learn while solving mathematics problems? Journal of Educational Psychology, 77, 272-284.

Pace, A. (1961). Understanding and the ability to solve problems. Arithmetic Teacher, 8, 226-233.

Paul, D., Nibbelink, W., & Hoover, H. (1986). The effects of adjusting readability on the difficulty of mathematics story problems. Journal for Research in Mathematics Education, 17, 163-172.

Pereira-Mendoza, L. (1980). The effect of teaching heuristics on the ability of Grade Ten students to solve novel mathematical problems. Journal of Educational Research, 73, 139-144.

Phillips, E., Uprichard, A., & Johnson, H. (1974). The correlation of selected mathematical measures with problem solving ability. Florida Journal of Educational Research, 16, 3-11.

Petty, O. (1956). Non-paper-and-pencil solution of problems: An experimental study. Arithmetic Teacher, 3, 229-235.

Plumlee, L. (1949). The verbal component in mathematics items. Educational and Psychological Measurement, 9, 679-684.

Post, T., & Brennan, M. (1976). An experimental study of the effectiveness of a formal versus an informal presentation of a general heuristic process on problem solving in tenth-grade geometry. Journal for Research in Mathematics Education, 7, 59-64.

Reed, S. (1985). Effect of computer graphics on improving estimates to algebra word problems. Journal of Educational Psychology, 77, 285-298.

Reed, S., Dempster, A., & Ettinger, M. (1985). Usefulness of analogous solutions for solving algebra word problems. Journal of Experimental Psychology, 11, 106-125.

Reed, S., & Ettinger, M. (1987). Usefulness of tables for solving word problems. Cognition and Instruction, 4, 43-59.

Rieber, L. (1987). LOGO and its promise: A research report. Educational Technology, 27, 12-16.

Roberge, J., & Flexer, B. (1983). Cognitive style, operativity, and mathematics achievement. Journal for Research in Mathematics Education, 14, 344-353.

Robertson, M. (1931, November). Problem solving in arithmetic. Peabody Journal of Education, 9, 176-183.

Rosenthal, D., & Resnick, L. (1974). Children's solution processes in arithmetic word problems. Journal of Educational Psychology, 66, 817-825.

Ross, S., McCormick, D., & Krisak, N. (1986). Adapting the thematic context of mathematical problems to student interests: Individualized versus group-based strategies. Journal of Educational Research, 79, 245-252.

Russell, D., & Holmes, F. (1941). An experimental comparison of algebraic reading practice and the solving of additional verbal problems in tenth grade algebra. Mathematics Teacher, 34, 347-352.

Sagiv, A. (1978). Hierarchial structure of learner abilities in verbal computation problem-solving related to strength of material. International Journal of Mathematics Education and Science Technology, 9, 451-456.

Schell, L., & Burns, P. (1962). Pupil performance with three types of subtraction problems. School Science and Mathematics, 62, 208-214.

Schoenfeld, A. (1979). Explicit heuristic training as a variable in problem-solving performance. Journal for Research in Mathematics Education, 10, 173-187.

Schoenfeld, A. (1982). Measures of problem-solving performance and of problem-solving instruction. Journal for Research in Mathematics Education, 13, 31-49.

Schoenfeld, A., & Herrmann, D. (1982). Problem perception and knowledge structure in expert and novice mathematical problem solvers. Journal of Experimental Psychology: Learning, Memory, and Cognition, 8, 484-494.

Scott, L. (1963). A study of teaching division through the use of two algorithms. School Science and Mathematics, 63, 739-752.

Scott, R., & Lighthall, F. (1967). Relationship between content, sex, grade, and degree of disadvantage in arithmetic problem solving. Journal of School Psychology, 6, 61-67.

Sheehan, T. (1968). Patterns of sex differences in learning mathematical problem-solving. Journal of Experimental Education, 36(4), 84-87.

Sherman, J. (1979). Predicting mathematics performance in high school girls and boys. Journal of Educational Psychology, 71, 242-249.

Sherrill, J. (1973). The effects of different presentations of mathematical word problems upon the achievement of tenth grade students. School Science and Mathematics, 73, 277-282.

Silver, E. (1979). Student perceptions of relatedness among mathematical verbal problems. Journal for Research in Mathematics Education, 10, 195-210.

Silver, E. (1981). Recall of mathematics problem information: Solving related problems. Journal for Research in Mathematics Education, 12, 54-64.

Spache, G. (1947). A test of ability in arithmetic reasoning. Elementary School Journal, 47, 442-445.

Spilman, H., & Weiner, M. (1972). A study of student performance on arithmetic presented in verbal and nonverbal forms. Measurement and Evaluation in Guidance, 5, 446-449.

Steffe, L. (1968). The relationship of conservation of numerousness to problem-solving abilities of first-grade children. Arithmetic Teacher, 15, 47-52.

Steffe, L. (1970). Differential performance of first-grade children when solving arithmetic addition problems. Journal for Research in Mathematics Education, 1, 144-161.

Steffe, L., & Johnson, D. (1971). Problem-solving performances of first-grade children. Journal for Research in Mathematics Education, 2, 50-64.

Steiner, M. (1934). Value of home-study assignments. School and Society, 40, 20-24.

Stevens, B. (1932). Problem solving in arithmetic. Journal of Educational Research, 25, 253-260.

Sutherland, J. (1941). Investigation into some aspects of problem solving in arithmetic. Part I. British Journal of Educational Psychology, 11, 215-222.

Szetela, W. (1980). Calculators and the teaching of ratios in Grade 7. Journal for Research in Mathematics Education, 11, 67-70.

Szetela, W. (1982). Story problem solving in elementary school mathematics: What differences do calculators make? Journal for Research in Mathematics Education, 13, 381-389.

Szetela, W., & Super, D. (1987). Calculators and instruction in problem solving in Grade 7. Journal for Research in Mathematics Education, 18, 215-229.

Threadgill-Sowder, J. (1983). Question placement in mathematical word problems. School Science and Mathematics, 83, 107-111.

Threadgill-Sowder, J., & Sowder, L. (1982). Drawn versus verbal formats for mathematical story problems. Journal for Research in Mathematics Education, 13, 324-331.

Threadgill-Sowder, J., Sowder, L., Moyer, J., & Moyer, M. (1985). Cognitive variables and performance on mathematical story problems. Journal of Experimental Education, 54(1), 56-62.

Travers, K. (1967). A test of pupil preference for problem-solving situations in junior high school mathematics. Journal of Experimental Education, 35(4), 9-18.

Treacy, J. (1944). The relationship of reading skills to the ability to solve arithmetic problems. Journal of Eduational Research, 38, 86-96.

Vanderlinde, L. (1964). Does the study of quantitative vocabulary improve problem solving? Elementary School Journal, 65, 143-152.

Vos, K. (1976). The effects of three instructional strategies on problem-solving behaviors in secondary school mathematics. Journal for Research in Mathematics Education, 7, 264-275.

Washburne, C. (1927). Comparison of two methods of teaching pupils to apply the mechanics of arithmetic to the solution of problems. Elementary School Journal, 27, 758-767.

Washburne, C., & Morphett, M. (1928). Unfamiliar situations as a difficulty in solving arithmetic problems. Journal of Educational Research, 18, 220-224.

Washburne, C., & Osborne, R. (1926a). Solving arithmetic problems. I. Elementary School Journal, 27, 219-226.

Washburne, C., & Osborne, R. (1926b). Solving arithmetic problems. II. Elementary School Journal, 27, 296-304.

Weaver, F. (1971). Some factors associated with pupils' performance levels on simple open addition and subtraction sentences. Arithmetic Teacher, 18, 513-518.

Webb, L., & Sherrill, J. (1974). The effects of differing presentations of mathematical word problems upon the achivement of preservice elementary teachers. School Science and Mathematics, 76, 559-565.

Werdelin, I. (1966). A synthesis of two factor analyses of problem solving in mathematics. Didakometry, 8, 1-23.

Wheatley, C. (1980). Calculator use and problem-solving performance. Journal for Research in Mathematics Education, 11, 323-334.

Williams, M., & McCreight, R. (1965). Shall we move the question? Arithmetic Teacher, 12, 418-421.

Willis, G., & Fuson, K. (1988). Teaching children to use schematic drawings to solve addition and subtraction problems. Journal of Educational Psychology, 80, 192-201.

Wilson, J. (1967). The role of structure in verbal problem solving. Arithmetic Teacher, 14, 486-497.

Wright, J., & Wright, C. (1986). Personalized verbal problems: An application of the language experience approach. Journal of Educational Research, 79, 358-362.

Dissertations

(DAI in the following references refers to Dissertation Abstracts International.)

Abo-Elkhair, M. (1981). An investigation of the effectiveness of using minicalculators to teach the basic concepts of average in the upper elementary grades (Florida State University, 1980). DAI, 41, 2980A.

Adams, R. (1930). A study of the comparative value of two methods of improving problem solving ability in arithmetic (University of Pennsylvania). DAI, L1930.

Alexander, V. (1959). The relationship of selected factors to the ability to solve problems in arithmetic. DAI, 20, 1221. (University Microfilms No. 59-03,057)

Ammon, R., Jr. (1973). An analysis of oral and written responses in developing mathematical problems through pictorial and written stimuli (Pennsylvania State University, 1972). DAI, 34, 1056A-1057A.

Arnold, W. (1969). Knowledge of vocabulary, ability to formulate equations, and ability to solve verbal problems: An investigation of relationships (University of Oregon, 1968). DAI, 29, 2031A-2032A.

Ashton, M. (1962). Heuristic methods in problem solving in ninth grade algebra. DAI, 22, 4289. (University Microfilms No. 62-02,320)

Babbitt, B. (1986). The contributions of concepts and computations to children's problem solving performance in mathematics. DAI, 47, 111A. (University Microfilms No. 86-06,447)

Bamberger, H. (1985). The effect of Logo (Turtle Graphics) on the problem solving strategies used by fourth grade children (University of Maryland, 1984). DAI, 46, 918A.

Barnett, J. (1975). Toward a theory of sequencing: Study 3-7: An investigation of the relationships of structural variables, instructions, and difficulty in verbal, arithmetic problem solving (Pennsylvania State University, 1974). DAI, 36, 99A-100A.

Barron, E. (1979). The effects of stressing heuristics in mathematical problem solving with in-service elementary school teachers. DAI, 39, 6602A-6603A. (University Microfilms No. 79-08,484)

Barszczewski, M. (1986). Problem-solving approaches and changes in approach used by community college students (New York University, 1985). DAI, 46, 2219A.

Bechtold, C. (1965). The use of extraneous material in developing problem-solving ability of pupils in Algebra I. DAI, 26, 3105. (University Microfilms No. 65-09,149)

Beldin, H. (1960). A study of selected arithmetic verbal problem-solving skills among high and low achieving sixth grade children. DAI, 21, 1418. (University Microfilms No. 60-02,597)

Bezuk, N. (1987). Variables affecting seventh grade students' performance and solution strategies on proportional reasoning word problems (University of Minnesota, 1986). DAI, 47, 3932A.

Biddle, J. (1967). Effectiveness of two methods of instruction of high school geometry on achievement, retention, and problem solving ability (Indiana University, 1966). DAI, 27, 3356A.

Biegen, D. (1972). The effects of irrelevant and immaterial data on problem difficulty (University of Cincinnati, 1971). DAI, 32, 3774A.

Billings, L., Jr. (1987). Development of mathematical task persistence and problem-solving ability in fifth and sixth grade students through the use of Logo and heuristic methodologies (Northern Arizona University, 1986). DAI, 47, 2433A.

Blake, J. (1979). Analyzing the solution of problems involving three-dimensional geometric figures: An exploratory study (University of Tennessee, 1978). DAI, 39, 5404B.

Blake, R. (1977). The effect of problem context upon the problem solving processes used by field dependent and independent students: A clinical study (University of British Columbia, 1976). DAI, 37, 4191A-4192A.

Blomstedt, R. (1974). The effects of consensus on verbal problem solving in middle school mathematics. DAI, 35, 2523A-2524A. (University Microfilms No. 74-24,830)

Blubaugh, W. (1985). Effect of a semester of instruction in different computer programming languages on mathematical problem solving skills of high school students (University of Colorado at Boulder, 1984). DAI, 45, 3086A.

Blumhagen, B. (1984). The effects of cognitive strategies on verbal mathematical problem scores of native Americans (Northern Arizona University). DAI, 45, 487A.

Boersig, T. (1973). The effects of instruction in the enactive mode of representation on multivariable verbal problems encountered in elementary algebra. DAI, 34, 3230A. (University Microfilms No. 73-28,047).

Bolduc, E. (1970). A factorial study of the effects of three variables on the ability of first-grade children to solve arithmetic problems (University of Tennessee, 1969). DAI, 30, 3358A.

Boling, M. (1977). Some cognitive and affective aspects of the use of hand-held calculators in high school consumer mathematics classes (Louisiana State University). DAI, 38, 2623A.

Bratton, G. (1978). The effect of heuristic instruction on problem solving ability in college algebra (Mississippi State University, 1977). DAI, 38, 4001A.

Bredie, J. (1980). The mediated acquisition and application of heuristic problem-solving strategies in a defined word-problem task. DAI, 41, 160A. (University Microfilms No. 80-16,495)

Brenner, R. (1981). Elementary school students' abilities to read and solve arithmetic word problems: A study of prerequisite skills. DAI, 42, 1947A. (University Microfilms No. 81-22,805)

Brewer, K. (1981). A study of the effect of problem solving instruction on the student's ability to solve mathematical verbal problems. DAI, 42, 1944A. (University Microfilms No. 81-21,772)

Brink, J. (1982). The effect of training in translation of verbal mathematical problems on problem solving achievement (Brigham Young University). DAI, 43, 1866A.

Brown, W., Jr. (1981). Elementary school peer tutoring in mathematical verbal problem solving (Yeshiva University). DAI, 42, 1457A.

Brubaker, E. (1982). The effect of an instructional strategy oriented toward mathematical applications from an activity learning perspective upon achievement and attitudes of ninth grade general mathematics students: An exploratory study (Temple University). DAI, 43, 1070A.

Bruggeman, J. (1986). The effects of modeling and inspection methods upon problem solving in a computer programming course (Montana State University, 1985). DAI, 46, 1821A.

Bujan-Delgado, V. (1983). A study of the relationships between socioeconomic characteristics and aspects of mathematical achievement of primary school children of grades four and six in Costa Rica. DAI, 43, 2583A. (University Microfilms No. 83-00,215)

Burch, R. (1949). An evaluation of analytic testing in arithmetic problem solving. Durham, NC: Duke University.

Burton, G. (1987). Essay writing in college mathematics and its effect on achievement (Virginia Commonwealth University, 1986). DAI, 47, 2492A.

Burzler, D., Jr. (1983). An investigation of the three level construct of comprehension for verbal mathematics problems (University of Connecticut, 1982). DAI, 43, 2616A.

Butler, C. (1957). A study of the relation between children's understanding of computational skills and their ability to solve verbal problems in arithmetic (Boston University School of Education). DAI, 16, 2400.

Butscher, S. (1981). The effect of augmenting beginning algebra word problems with perceptual referents (University of California, Berkeley, 1980). DAI, 41, 2981A.

Campbell, D. (1956). Factorial comparison of arithmetic performance of boys in sixth and seventh grades. Catholic University of America Educational Research Monographs, 20(2), 1-25.

Canner, J. (1979). Imagery and mathematics word-problem solving in elementary school students. DAI, 40, 1352A-1353A. (University Microfilms No. 79-20,662)

Chapin, S. (1988). An investigation into the impact of instructional format on the ability of college students to solve equivalent and similar mathematics problems. DAI, 48, 2267A. (University Microfilms No. 87-27,790)

Chapman, E. (1981). Generative learning of word problems in mathematics. DAI, 42, 120A. (University Microfilms No. 81-13,826)

Cheshire, F. (1981). The effect of learning computer programming skills on developing cognitive abilities (Arizona State University). DAI, 42, 645A.

Christensen, E. (1980). Reality versus fantasy in algebra word problems: An investigation of the context preferences of students (University of Kentucky). DAI, 41, 574A.

Christian, W. (1984). A comparison of the effectiveness of three strategies for teaching word problems at the intermediate algebra level to college students (Auburn University). DAI, 45, 2790A.

Chuku, J. (1987). A study of heuristic strategies and their uses in solving mathematical problems (Southern Illinois University at Carbondale, 1986). DAI, 47, 2492A.

Clark, A. (1968). A creative versus a traditional approach to teaching story problems (University of Utah, 1967). DAI, 28, 2929B.

Clarkson, S. (1979). A study of the relationships among translation skills and problem-solving abilities (University of Georgia, 1978). DAI, 39, 4101A.

Cohen, M. (1976). Interest and its relationship to problem-solving ability among secondary school mathematics students. Austin: University of Texas at Austin. (ERIC Document Reproduction Service No. ED 137 071)

Collenback, L. (1983). Computer supported problem solving in secondary advanced mathematics. DAI, 43, 2264A. (University Microfilms No. 82-27,637)

Conradi, M. (1975). Ordered word problems: A study of their effectiveness for elementary school students in solving word problems (University of Cincinnati). DAI, 36, 2268B-2269B.

Corle, C. (1954). The characteristics of good and poor problem solvers in sixth grade arithmetic (University of Cincinnati). DAI, W1954, 188.

Crowe, K. (1975). The relative effectiveness of two methods for translating worded problems in algebra into open sentences (University of Illinois at Urbana-Champaign). DAI, 36, 2732A.

Danial, S. (1986). Relationships between mathematical ability, attentional and interpersonal style and achievement in a problem-solving oriented computer programming course (University of Pittsburgh, 1985). DAI, 46, 3276A-3277A.

Deep, R. (1977). The relative effects of translating from mathematics to English and from English to mathematics on verbal problem solving in Algebra 2 (Florida State University, 1976). DAI, 37, 6323A-6324A.

Demeter, M. (1986). An investigation of the problem solving processes used by art/music talent students to solve multistep mathematical problems. DAI, 47, 1228A. (University Microfilms No. 86-14,321)

Denmark, E. (1965). A comparative study of two methods of teaching elementary algebra students to use the algebraic technique to solve verbal problems (Florida State University, 1964). DAI, 25, 5295-5296.

Devenney, R. (1982). A study of the effects of a heuristics technique and a conventional textbook technique on the problem solving abilities of thirty-five eighth grade boys (Temple University). DAI, 43, 1070A-1071A.

Di Napoli, P. (1937). Homework in the New York City elementary schools. Teachers College, Columbia University, Contributions to Education, No. 719.

Donohue, J. (1957). Factorial comparison of arithmetic problem-solving ability of boys and girls in seventh grade. Washington, DC: Catholic University of America Press.

Doty, R. (1940). A study of children's procedures in the solution of verbal problems. Durham, NC: Duke University.

Druva, C. (1984). A comparison of the comprehension skills used in problem solving by math-anxious and non-math-anxious students enrolled in college-level mathematics courses (University of Minnesota). DAI, 45, 1341A.

Dugger, C. (1985). A study of the effectiveness of field-dependent/field-independent instruction on the mathematics problem solving ability of Hispanic students. DAI, 45, 2388A. (University Microfilms No. 84-24,040)

Dvarskas, D. (1984). The effects of introductory computer programming lessons on the learners' ability to analyze mathematical word problems (University of Connecticut, 1983). DAI, 44, 2665A.

Early, J. (1968). A study of children's performance on verbally stated arithmetic problems with and without word clues (University of Alabama, 1967). DAI, 28, 2889A.

Economopoulos, M. (1979). A study interrelating decision theory, situational problem solving, and divergent thinking among gifted secondary mathematics students (Georgia State University, 1978). DAI, 39, 4102A-4103A.

Edwards, L., Jr. (1977). The effects of a problem solving model as an alternative in the general mathematics curriculum (Utah State University, 1976). DAI, 37, 6239A.

Edwards, R. (1957). Factorial comparison of arithmetic performance of girls and boys in sixth grade (Catholic University of America). DAI, X1957.

Ehr, C. (1980). Cognitive style and information selection during the solution of mathematics word problems (University of Georgia, 1979). DAI, 40, 5768A.

Elliott, J. (1981). The effect of using hand-held calculators on verbal problem solving ability of sixth grade students (University of Oregon, 1980). DAI, 41, 3464A.

Emm, M. (1959). A factorial study of the problem solving ability of fifth-grade boys. Washington, DC: Catholic University of America Press.

Engelhard, M. (1955). An experimental study of arithmetic problem-solving of sixth grade girls. Catholic University of America, Educational Research Monographs, 19(4).

Engelhardt, J. (1981). The effects of systematic instruction in verbal problem solving on the achievement of sixth-grade students. DAI, 42, 585A-586A. (University Microfilms No. 81-17,424)

Erion, R. (1986). The effect of mode of representation and problem complexity on performance in a problem situation by preservice elementary school teachers (Texas A & M University, 1985). DAI, 46, 2952A.

Esposito, P. (1984). The effects of strategy games on measures of problem solving, mathematics anxiety, and logical reasoning on selected undergraduate elementary education majors (Temple University). DAI, 45, 79A.

Estes, R. (1971). The effect of translation practice and group participation in solving verbal problems for prospective elementary teachers (University of Michigan, 1970). DAI, 31, 6274A-6475A.

Ewing, D. (1985). A study of student cognitive processes with respect to selected Algebra I word problems by means of a constructed reading test (Kansas State University, 1984). DAI, 46, 93A.

Exezidis, R. (1983). An investigation of the relationship of reading comprehension, vocabulary, mathematical concepts, and computation on problem solving among Anglo, Black, and Chicano male and female middle school adolescents (University of Houston, 1982). DAI, 43, 2264A-2265A.

Fernandez, L. (1986). Effects of two instructional strategies on solving algebra word problems of remedial college students (Fordham University, 1985). DAI, 46, 3234A.

Fickel, M. (1986). The effects of Logo study on problem-solving cognitive abilities of sixth-grade students (University of Nebraska-Lincoln). DAI, 47, 2066A.

Fisher, N. (1973). Mathematical problem-solving's mathelation component related to achivement, attitude, critical thinking in prospective elementary teachers (Indiana University, 1972). DAI, 33, 5965A-5966A.

Fluck, S. (1982). The effects of playing and analyzing computational-strategy games on the problem solving and computational ability of selected fifth grade students (Temple University). DAI, 42, 5020A.

Ford, M. (1985). The effects of computer programming on the problem solving abilities of sixth grade students (Arizona State University, 1984). DAI, 46, 406A.

Foster, T. (1973). The effect of computer programming experiences on student problem solving behaviors in eighth grade mathematics (University of Wisconsin, 1972). DAI, 33, 4239A-4240A.

Fowler, E. (1978). A study interrelating situational problem solving, mathematical model building, and divergent thinking among gifted secondary mathematics students (Georgia State University). DAI, 39, 2111A-2112A.

Garrard, S. (1982). Sex differences, spatial visualization ability and the effects of induced and imposed imagery on problem solving performance (University of Southern California). DAI, 43, 115A.

Geisert, P. (1972). A study of the hierarchial competencies underlying the problem solving use of proportion (Florida State University, 1971). DAI, 32, 5103A-5104A.

George, R. (1984). The influence of pictures, type of problem and sex on the solution of one- and two-step mathematics story problems containing extraneous information by fourth, fifth and sixth graders. DAI, 45, 1062A. (University Microfilms No. 84-16,841)

Gerlach, G. (1985). The interaction of task-structure and achievement in problem solving in field dependent and field independent fourth grade students (Temple University). DAI, 46, 653A.

Germain-McCarthy, Y. (1987). The analysis and instruction of the heuristic process: "Think of a simpler problem." DAI, 47, 3690A. (University Microfilms No. 87-03,028)

Ghunaym, G. (1986). An investigation of the effect of instruction in the structure of problem-solving strategies on students' performance (Florida State University, 1985). DAI, 46, 2605A-2606A.

Giffune, M. (1979). The effect of inservice training in reading upon students' ability to solve verbal problems in mathematics. DAI, 40, 2572A. (University Microfilms No. 79-23,863)

Gilbert, D. (1976). A comparison of three methods of teaching mathematics in fourth grade: Cognitive and affective dimensions (Loyola University of Chicago). DAI, 37, 111A.

Gilbert-Macmillan, K. (1984). Mathematical problem solving in cooperative small groups and whole class instruction. DAI, 44, 2700A. (University Microfilms No. 83-29,718)

Gimmestad, B. (1977). An exploratory study of the processes used by community college students in mathematical problem solving (University of Colorado at Boulder, 1976). DAI, 37, 7590A.

Godgart, M. (1965). The arithmetic problem-solving ability of teachers as related to their effectiveness in teaching problem-solving (University of Connecticut, 1964). DAI, 26, 793-794.

Goldberg, D. (1975). The effects of training in heuristic methods on the ability to write proofs in number theory. DAI, 35, 4989B. (University Microfilms No. 75-07,836)

Goldberg, S. (1980). The effects of the use of strategy games on the problem solving ability of selected seventh grade students (Temple University). DAI, 41, 1990A-1991A.

Gonzalez, A. (1984). Effectiveness of problem-solving activities in changing preservice elementary school teachers' attitudes toward mathematical problem solving (Pennsylvania State University, 1983). DAI, 45, 107A-108A.

Gonzales, N. (1987). An exploratory study on the teaching of diagram-drawing as a problem solving strategy in college algebra. DAI, 47, 2494A. (University Microfilms No. 86-20,700)

Goodwin, P. (1981). A study to examine the effect of curriculum materials on the ability of general mathematics students to solve verbal problems (University of Nevada, Las Vegas, 1980). DAI, 42, 121A-122A.

Gordon, J., Jr. (1984). The effect of teaching college developmental studies algebra students to draw diagrams when solving mathematics problems (Georgia State University, 1983). DAI, 44, 2396A.

Graham, V. (1978). The effect of incorporating sequential steps and pupil-constructed problems on performance and attitude in solving one-step verbal problems involving whole numbers. DAI, 39, 2028A. (University Microfilms No. 78-17,588)

Grunau, R. (1976). Effects of elaborative prompt condition and developmental level on performance of addition problems by kindergarten children (University of British Columbia, 1975). DAI, 36, 4349A.

Hagelberg, R. (1958). A study of the effectiveness of specific procedures for solving arithmetic problems (University of Iowa, 1957). DAI, 17, 2878.

Hall, T. (1976). A study of situational problem solving by gifted high school mathematics students (Georgia State University). DAI, 37, 906A-907A.

Hall, W. (1977). A study of the relationship between estimation and mathematical problem solving among fifth grade students (University of Illinois at Urbana-Champaign, 1976). DAI, 37, 6324A-6325A.

Hamada, R. (1987). The relationship between learning Logo and proficiency in mathematics. DAI, 47, 2510A. (University Microfilms No. 86-23,535)

Hamilton, E. (1986). An investigation of the relationship between rational number translation skills and mathematical problem solving skills (Northwestern University). DAI, 47, 818A.

Harik, F. (1982). The influence of problem structure on problem difficulty and problem-solving processes (Indiana University, 1981). DAI, 42, 3048A.

Harmon, A. (1970). Problem solving in contemporary mathematics: The relative merits of two methods of teaching problem solving in the elementary school (New York University, 1969). DAI, 30, 3748B.

Harsh, M. (1986). Effects of an extensive verbal problem solving approach on first graders' verbal problem solving and computation skills (University of Southern Mississippi, 1985). DAI, 46, 3247A.

Hasty, M. (1987). An attempt to devise a teaching strategy to overcome reversal problems in translating word problems into mathematical notation (Southern Illinois University at Cardondale, 1986). DAI, 47, 3345A.

Heckman, M. (1963). The relative merits of two methodologies for teaching verbal arithmetic problems to undergraduate elementary education majors (Indiana University, 1962). DAI, 23, 3797.

Heine, B. (1972). An investigation of the effect of teaching selected topics in elementary mathematical logic on problem-solving ability of fifth grade students (Temple University). DAI, 33, 1587A.

Hemphill, S. (1941). Improving linguistic ability as a factor in solving problems in algebra (University of Kansas). DAI, W1941, 90.

Herring, R. (1982). Solving algebra word problems: A comparison of instructional strategies and problem characteristics (University of Iowa, 1981). DAI, 42, 3016B-3017B.

Herrington, J. (1980). Experimental analysis of cognitive style and information processing variables in mathematical problem solving (Southern Illinois University at Edwardsville). DAI, 41, 973A-974A.

Hesemann, J. (1976). A spatial model for the cognitive representation of verbal algebra problems (Indiana University). DAI, 37, 2037A.

Heyn, J. (1980). Age and sex differences in errors in problem solving (University of Georgia). DAI, 41, 2364B.

Holdan, E. (1986). A comparison of the effects of traditional, exploratory, distributed, and a combination of distributed and exploratory practice on initial learning, transfer, and retention of verbal problem types in first-year algebra (Pennsylvania State University, 1985). DAI, 46, 2542A.

Hopkins, B. (1978). The effect of a hand-held calculator curriculum in selected fundamentals of mathematics classes (University of Texas at Austin). DAI, 39, 2801A.

Horsman, R. (1940). A comparison of methods of teaching verbal problems in arithmetic in grades five, six, seven, and eight (University of Pittsburgh). DAI, W1940, 86.

Howlett, K. (1974). A study of the relationship between Piagetian class inclusion tasks and the ability of first grade children to do missing addend computation and verbal problems (State University of New York at Buffalo, 1973). DAI, 34, 6259A-6260A.

Hudgins, B. (1959). The effects of initial group experience upon subsequent individual ability to solve arithmetic problems (Washington University, 1958). DAI, 19, 2851-2852.

Hunkler, R. (1969). Achievement of sixth-grade pupils in modern mathematics as related to their teachers' mathematics preparation (Texas A & M University, 1968). DAI, 29, 3897A-3898A.

Ingle, J. (1975). Prediction of word problem difficulty on the basis of problem characteristics (George Peabody College for Teachers). DAI, 36, 2157A-2158A.

Ireland, S. (1980). The effects of certain factors upon third grade children's ability to solve written verbal arithmetic problems (Loyola University of Chicago). DAI, 40, 5769A-5770A.

James, J. (1973). A study of the effects of problem-solving strategies developed in teacher in-service workshops on fourth and fifth grade childrens' achievement (Wayne State University, 1972). DAI, 33, 6649A-6650A.

James, J. (1967). A comparison of performance of sixth-grade children in three arithmetic tasks: Typical textbook verbal problems; revised verbal problems including irrelevant material; and computational exercises (University of Alabama). DAI, 28, 2030B.

Jimenez, M. (1984). A study of the effects of certain variables upon 4th and 6th grade Costa Rican children's ability to solve arithmetic word problems. DAI, 44, 3278A. (University Microfilms No. 84-03,536)

Johnson, L. (1986). The effects of the Groups of Four cooperative learning model on student problem-solving achievement in mathematics (University of Houston, 1985). DAI, 47, 403A.

Johnson, M. (1979). Mathematics problem solving and classroom environment (University of Wisconsin-Madison). DAI, 40, 3172A.

Jones, H. (1985). Aptitude-treatment interaction of two methods of instruction in arithmetic problem-solving (University of Iowa, 1984). DAI, 46, 340A-341A.

Jones, J. (1982). Problem solving behaviour and attitude of prospective elementary teachers with a history of math avoidance as a function of heuristics and discussion (University of Washington, 1981). DAI, 42, 5049A.

Kamins, M. (1971). An exploratory study of the effect of familiar language on the ability of black children to achieve success with the solving of word problems (Wayne State University). DAI, 32, 2402A.

Kasnic, M. (1978). The effect of using hand-held calculators on mathematical problem-solving ability among sixth grade students. DAI, 38, 5311A. (University Microfilms No. 78-01,276)

Keil, G. (1965). Writing and solving original problems as a means of improving verbal arithmetic problem solving ability (Indiana University, 1964). DAI, 25, 7109-7110.

Kellar, W. (1940). The relative contribution of certain factors to individual differences in algebraic problem solving ability (Catholic University of America). DAI, W1940, 78.

Keller, J. (1984). The effects of table-building problem-solving procedures on students' understanding of variables in pre-algebra. DAI, 45, 1673A-1674A. (University Microfilms No. 84-18,957)

Kellerhouse, K., Jr. (1975). The effects of two variables on the problem solving abilities of first grade and second grade children (Indiana University, 1974). DAI, 35, 5781A.

Kerns, C. (1977). A study of the effects of two different methods for incorporating application problems into college algebra (University of Northern Colorado). DAI, 38, 1954A-1955A.

Kilpatrick, J. (1968). Analyzing the solution of word problems in mathematics: An exploratory study. DAI, 28, 4380A. (University Microfilms No. 68-06,442)

Kliebahn, M. (1955). An experimental study of arithmetic problem-solving ability of sixth grade boys. Catholic University of America, Educational Research Monographs, 19, No. 3.

Knippenberg, G. (1979). An exploratory study of the effects of instruction in heuristics upon the mathematical problem-solving ability and attitudes of preservice elementary teachers (Michigan State University, 1978). DAI, 40, 724A-725A.

Konsin, M. (1981). Spatial visualization and mathematical problem solving (University of Wisconsin-Madison, 1980). DAI, 41, 3930A-3931A.

Kove, L. (1973). Deductive reasoning and problem solving (University of Connecticut). DAI, 34, 1487A.

Kuzminski, P. (1984). The effects of specialized skill instruction on the ability of sixth-grade students to solve mathematical word problems (North Texas State University). DAI, 45, 777A.

Lamanna, J. (1969). The effect of teacher verbal behavior on pupil achievement in problem solving in sixth grade mathematics (St. John's University, 1968). DAI, 29, 3042A-3043A.

Landau, M. (1984). The effects of spatial ability and problem presentation format on mathematical problem solving performance of middle school students (Northwestern University). DAI, 45, 442A-443A.

Langbort, C. (1983). An investigation of the ability of fourth grade children to solve word problems using hand-held calculators. DAI, 43, 2914A. (University Microfilms No. 83-00,563)

Larsen, C. (1961). The heuristic standpoint in the teaching of elementary calculus. DAI, 21, 2632-2633. (University Microfilms No. 60-06,740)

Layne, T. (1982). A comparison study of the relative effectiveness of two problem-solving strategies when taught to poorly prepared college mathematics students (George Peabody College for Teachers of Vanderbilt University). DAI, 43, 1867A.

LeBlanc, J. (1968). The performance of first grade children in four levels of conservation of numerousness and three I.Q. groups when solving arithmetic subtraction problems (University of Wisconsin). DAI, 29, 67A.

Lee, J. (1978). The effects of process behaviors on problem-solving performance in various tests (University of Chicago). DAI, 39, 2149A.

Leggette, E. (1973). The effect of a structured problem-solving process on the problem-solving capability of capable but poorly prepared college freshmen in mathematics. DAI, 34, 3838A. (University Microfilms No. 73-32,223)

Leitman, S. (1986). Effects of computer programming on mathematics problem solving with ninth-grade students using a unit on flow-charting (Fordham University). DAI, 47, 2067A.

Leno, R. (1959). Children's methods of problem solving in arithmetic. DAI, 19, 2549. (University Microfilms No. 59-00,242)

Levin, K. (1987). The relationship between method of teaching computer programming and improvement in problem solving skills. DAI, 48, 860A. (University Microfilms No. 87-16,089)

Lindstedt, S. (1963). Changes in patterns of thinking produced by a specific problem solving approach in elementary arithmetic (University of Wisconsin, 1962). DAI, 23, 2032.

Linville, W. (1970). The effects of syntax and vocabulary upon the difficulty of verbal arithmetic problems with fourth grade students (Indiana University, 1969). DAI, 30, 4310A.

Lipson, S. (1972). The effects of teaching heuristics to student teachers in mathematics. DAI, 33, 2221A-2222A. (University Microfilms No. 72-30,334)

Liu, J. (1983). The effect of concept instruction on students' abilities to apply algorithms to solve mathematics problems (University of South Carolina). DAI, 44, 1013A.

Lodholz, R. (1982). The effects of student composition of mathematical verbal problems on student problem solving performance. DAI, 42, 3483A-3484A. (University Microfilms No. 82-02,649)

Longshore, D., Jr. (1984). The effects of unfamiliar life situations in mathematics word problems on the performance of students (University of South Carolina, 1983). DAI, 45, 144A.

Love, B. (1986). The effects of training to facilitate the use of specific cognitive strategies on the creative thinking and mathematical problem-solving performance of fifth and eighth graders (Mississippi State University, 1985). DAI, 46, 2973A.

Luckinich, P. (1984). An investigation of the effects of instruction in diagramatic modeling and sentence writing on children's ability to solve verbal problems and number sentences. DAI, 44, 2397A. (University Microfilms No. 83-27,714)

Machida, K. (1987). The effects of a verbal mediation strategy on mathematical problem solving. DAI, 48, 2582A. (University Microfilms No. 87-29,410)

Malina, E. (1986). Problem writing as a means of enhancing problem solving performance. DAI, 47, 2006A-2007A. (University Microfilms No. 86-18,533)

Mandelbaum, J. (1974). A study of the effects, on achievement and attitude, of the use of the computer as a problem solving tool with low performing tenth grade students (Temple University, 1973). DAI, 34, 3700A.

Mansilla, C. (1988). The development of materials to teach basic programming and their effects on the problem solving skills and attitudes toward mathematics of secondary school students in the Province of Chaco (Argentina). DAI, 48, 1686A. (University Microfilms No. 87-21,427)

Marshall, P. (1983). Homework and social facilitation theory in teaching elementary school mathematics (Stanford University). DAI, 44, 416A-417A.

Martin, M. (1964). Reading comprehension, abstract verbal reasoning, and computation as factors in arithmetic problem solving (State University of Iowa, 1963). DAI, 24, 4547-4548.

Mayes, L. (1981). An evaluative study of the first year of an elementary school mathematics problem-solving program (University of Oregon, 1980). DAI, 41, 4633A.

Maxwell, A. (1975). An exploratory study of secondary school geometry students: Problem solving related to convergent-divergent productivity (University of Tennessee, 1974). DAI, 35, 4987A.

McCoy, L. (1987). The effect of computer programming experience on mathematical problem solving (Virginia Polytechnic Institute and State University). DAI, 48, 1105A.

McEwen, R. (1941). The effect of selected cues in children's solution of verbal problems in arithmetic. Durham, NC: Duke University.

McKee, L. (1983). Figure-drawing ability in solving mathematical problems (University of Georgia). DAI, 44, 417A.

McTaggert, H. (1959). A factorial study of the problem-solving ability of fifth-grade girls. Washington, DC: Catholic University of America Press.

Melnick, L. (1986). An investigation of two methods for improving problem solving performance of fifth grade students (Loyola University of Chicago). DAI, 47, 405A-406A.

Meyer, L. (1983). Teaching problem solving in a college level general education mathematics class. DAI, 43, 2584A. (University Microfilms No. 82-29,949)

Middaugh, D. (1980). Spatial ability and its relationship to the mathematics performance of adolescents (Kent State University, 1979). DAI, 40, 5349A.

Monaco, N. (1984). Cognitive developmental level, gender, and the development of learned helplessness on mathematics tasks (State University of New York at Buffalo). DAI, 45, 1346A-1347A.

Moore, B. (1972). The relationship of fifth-grade students' self-concepts and attitudes toward mathematics to academic achievement in arithmetical computation, concepts, and application (North Texas State University, 1971). DAI, 32, 4426A.

Moore, C. (1980). Differential effects of arithmetic and reading abilities, field-dependence, and mathematics anxiety on problem solving achievement of developmental mathematics students in a community college (Virginia Polytechnic Institute and State University). DAI, 41, 974A-975A.

Moore, R. (1987). The relationship between selected variables and arithmetic problem solving among community college students (Virginia Polytechnic Institute and State University, 1986). DAI, 47, 4010A-4011A.

Muraski, V. (1979). A study of the effects of explicit reading instruction on reading performance in mathematics and on problem solving abilities of sixth graders (Michigan State University, 1978). DAI, 39, 4104A.

Murphy, N. (1981). The effects of a calculator treatment on achievement and attitude toward problem solving in seventh grade mathematics. DAI, 42, 2008A. (University Microfilms No. 81-21,439)

Nabors, C. (1968). The effect of individualized verbal problem assignments on the mathematical achievement of fifth-grade students (University of Houston). DAI, 29, 1168A.

Neil, M. (1969). A study of the performance of third grade children on two types of verbal arithmetic problems. DAI, 29, 3337A. (University Microfilms No. 69-06,559)

Nelson, G. (1975). The effects of diagram drawing and translation on pupils' mathematics problem-solving performance (University of Iowa, 1974). DAI, 35, 4149A.

Nickel, A. (1971). A multi-experience approach to conceptualization for the purpose of improvement of verbal problem solving in arithmetic (University of Oregon). DAI, 32, 2917A-2918A.

Noll, R. (1983). Effects of verbal cueing and a visual representation on percent problem-solving performance of remedial adults. DAI, 43, 3833A. (University Microfilms No. 83-08,487)

Odafe, V. (1987). The effects of a problem solving instructional mode on the mathematics achievement of selected college students (Temple University). DAI, 47, 2935A-2936A.

O'Donnell, A. (1985). A program evaluation to investigate the effects of a problem-solving inservice component on classroom instruction (University of South Florida, 1984). DAI, 46, 319A.

O'Donnell, J. (1958). Levels of arithmetical achievement, attitude toward arithmetic, and problem solving behavior shown by prospective elementary teachers (Pennsylvania State University). DAI, 19, 1300.

Okoronkwo, E. (1985). Explicit instruction in heuristics as a variable in problem solving performance on college calculus. DAI, 46, 920A. (University Microfilms No. 85-13,275)

Ouellette, H. (1973). Effects of enrichment problems on attitude, problem solving ability and pattern recognition ability of prospective elementary school teachers (University of Northern Colorado, 1972). DAI, 33, 6222A.

Palzere, D. (1968). An analysis of the effects of verbalization and nonverbalization in the learning of mathematics (University of Connecticut, 1967). DAI, 28, 3034A-3035A.

Parler, J. (1975). Reading skills incorporated into mathematical instruction's effect on ability to solve mathematical word problems (University of South Carolina, 1974). DAI, 35, 6579A.

Paull, D. (1972). The ability to estimate in mathematics. DAI, 32, 3567. (University Microfilms No. 72-04,178)

Payne, H., Jr. (1984). The effects of three instructional techniques on the problem-solving ability of general education mathematics students at the junior college level. DAI, 44, 2670A. (University Microfilms No. 83-29,179)

Perunko, M. (1983). The relationships among mental imagery, spatial ability, analytic-synthetic processing and performance on mathematics problems (University of Maryland, 1982). DAI, 44, 1716A.

Portis, T. (1973). An analysis of the performances of fourth, fifth, and sixth grade students on problems involving proportions, three levels of aids, and three IQ levels (Indiana University, 1972). DAI, 33, 5871A-5872A.

Post, R. (1958). A study of certain factors affecting the understanding of verbal problems in arithmetic. DAI, 19, 90-91. (University Microfilms No. 58-02,242)

Post, T. (1968). The effects of the presentation of a structure of the problem-solving process upon problem-solving ability in seventh grade mathematics (Indiana University, 1967). DAI, 28, 454A.

Power, G. (1981). An investigation of the effects of direct and functional reading instruction upon mathematical problem solving abilities of elementary school children (University of Connecticut, 1980). DAI, 41, 3417A.

Prigge, G. (1974). The effects of three instructional settings on the learning of geometric concepts by elementary school children. Volumes I and II (University of Minnesota). DAI, 35, 3307A.

Proudfit, L. (1981). The examination of problem-solving processes by fifth-grade children and its effect on problem-solving performance (Indiana University, 1980). DAI, 41, 3932A.

Pusey, J. (1974). A comparison of the effects of three instructional procedures on achievement, self-esteem, and classroom adjustment of intermediate grade students in Title I schools. DAI, 34, 6369A.

Putt, I. (1979). An exploratory investigation of two methods of instruction in mathematical problem solving at the fifth grade level (Indiana University, 1978). DAI, 39, 5382A-5383A.

Quinto, A. (1984). Assessing metacognitive skills in problem solving (Pennsylvania State University, 1983). DAI, 45, 132A.

Rathmell, E. (1981). Teaching children to solve one-step word problems (University of Northern Iowa). (ERIC Document Reproduction Service No. ED 207 849)

Rebhun, A. (1973). The reflective-impulsive dimension and mathematical performance in the elementary school. DAI, 34, 3039A-3040A. (University Microfilms No. 73-28,970)

Reding, A. (1982). The effects of computer programming on problem solving abilities of fifth grade students (University of Wyoming;, 1981). DAI, 42, 3484A-3485A.

Rekdall, C. (1982). The effects of logical versus random sequencing of a spatial curriculum on the mathematical problem-solving and spatial abilities of intellectually, academically gifted fifth and sixth grade males and females (University of Washington). DAI, 43, 1819A.

Richardson, L., Jr. (1974). Student achievement in solving verbal problems as related to teacher preparation (George Peabody College for Teachers, 1973). DAI, 34, 3927B.

Riedesel, C. (1963). Procedures for improving verbal problem-solving ability in arithmetic (University of Iowa, 1962). DAI, 23, 2819.

Riley, J. (1977). An investigation of the effects of reading guides and a directed reading method upon word problem comprehension, problem solving ability, and attitude toward mathematics. DAI, 37, 7587A. (University Microfilms No. 77-09,897)

Roberts, G. (1984). A comparative study of the effects of two instructional strategies on improving conceptual and creative problem-solving abilities in algebra (University of Mississippi). DAI, 45, 1062A-1063A.

Robinson, M. (1973). An investigation of problem solving behavior and cognitive and affective characteristics of good and poor problem solvers in sixth grade mathematics (State University of New York at Buffalo). DAI, 33, 5620A.

Ronan, F. (1971). A study of the effectiveness of a computer when used as a teaching and learning tool in high school mathematics (University of Michigan). DAI, 32, 1264A-1265A.

Ross, P. (1981). Student difficulties in solving calculus word problems. DAI, 41, 3465A. (University Microfilms No. 80-29,567)

Roth, D. (1983). An experimental study to investigate the effects on achievement of sixth graders in mathematical problem solving using textbook problems compared to problems constructed by the teacher (University of Northern Colorado, 1982). DAI, 43, 2915A-2916A.

Rowe, W. (1980). An investigation of the effectiveness of the proposal of Richard A. Earle for teaching word problems in mathematics in selected topics and grade level (Auburn University, 1979). DAI, 40, 5351A.

Russell, T. (1988). The effect of vocabulary instruction on the students' problem solving ability in elementary school mathematics: An experimental study using the videocassette recorder. DAI, 49, 430A. (University Microfilms No. 88-01,867)

Rutledge, D. (1979). The effects of two decoding programs upon the mathematics problem solving achievement of fifth grade students (University of Nebraska-Lincoln, 1978). DAI, 39, 4105A.

Sage, E. (1963). An exploratory study of factors in quantitative problem solving as revealed by second grade children (Wayne State University, 1962). DAI, 24, 2061.

Sanders, V. (1973). Arithmetic problem solving strategies of fourth grade children (Wayne State University, 1972). DAI, 33, 5983A-5984A.

Sawyer, T. (1985). Algebra problem-solving strategies (Indiana University, 1984). DAI, 45, 3647B.

Schulman, L. (1982). The ability of fourth grade students to solve five types of mathematical problems. DAI, 42, 3895A-3896A. (University Microfilms No. 82-03,906)

Settle, M. (1977). The relative effects of instruction in the guess and test procedure on writing relevant equations to verbal problems in Algebra I (Florida State University). DAI, 38, 2633A-2634A.

Shoecraft, P. (1972). The effects of provisions for imagery through materials and drawings on translating algebra word problems, grades seven and nine (University of Michigan, 1971). DAI, 32, 3874A-3875A.

Shult, D. (1980). The effect of the hand-held calculator on arithmetic problem-solving abilities of sixth grade students (University of Oregon, 1979). DAI, 40, 6179A.

Simon, M. (1987). An external control study of diagram drawing skills for the solution of algebra word problems by novice problem solvers. DAI, 47, 3347A. (University Microfilms No. 87-01,220)

Smith, E. (1985). Investigation of an error analysis methodology for the study of sex differences in mathematics achievement (University of Nebraska-Lincoln, 1984). DAI, 45, 2046A-2047A.

Smith, H. (1968). The effects of instruction in set theory upon the logical reasoning of seventh-grade students and subsequent effects upon their learning to solve percentage problems (Arizona State University). DAI, 28, 4963A.

Smith, J. (1973). The effect of general versus specific heuristics in mathematical problem solving tasks. DAI, 34, 2400A. (University Microfilms No. 73-26,637)

Snethen, C. (1976). Peer support in the teaching of verbal problem solving in arithmetic. DAI, 37, 1980A. (University Microfilms No. 76-21,977)

Sousa, G. (1981). A comparison of alternative instructional approaches for the analysis of verbal mathematical problems. DAI, 42, 2548A. (University Microfilms No. 81-26,768)

Sparks, B. (1977). Pupil achievement in solving verbal problems in mathematics as related to teacher preparation and experience (George Peabody College for Teachers, 1976). DAI, 37, 5058A.

Spencer, J. (1975). Using the hand-held calculator in intermediate grade arithmetic. DAI, 35, 7048A. (University Microfilms No. 75-10,376)

Spratt, E. (1979). Effects of the location of subordinate clauses on comprehension of arithmetic problems by sixth graders (Hofstra University). DAI, 40, 179A-180A.

Spungin, R. (1981). The relationship of mathematics anxiety and problem solving attitude to the problem solving performance of female prospective early childhood teachers. DAI, 41, 3932A-3933A. (University Microfilms No. 81-01,915)

Stewart, J., Jr. (1981). Using the hand-held calculator as a computing aid for instruction in word-problem solving with elementary grade students (University of Illinois, 1980). DAI, 41, 4634A.

Stuart, A. (1967). Effects upon pupil performances in arithmetic of instructional programs differing in amounts of emphasis upon computational structure and verbal problem solving (Ohio University, 1965). DAI, 27, 4058A.

Stull, L. (1965). Auditory assistance of reading as a factor in intermediate-grade pupils' interpretations of verbal arithmetic problems (Pennsylvania State University, 1964). DAI, 25, 7113.

Sumagaysay, L. (1972). The effects of varying practice exercises and relating methods of solution in mathematics problem solving (University of Toronto, 1970). DAI, 32, 6751A.

Swart, W. (1970). A comparative study of the effect of high- and low-structure approaches to developing problem-solving ability in fourth grade children (University of Michigan, 1969). DAI, 31, 669A.

Swing, S. (1985). An investigation of integrative thought processes in mathematics learning (University of Wisconsin-Madison, 1984). DAI, 45, 3100A.

Swoope, R. (1983). The development and evaluation of an instructional program in problem-solving strategies for second year algebra students (Clark University). DAI, 44, 1717A-1718A.

Tabler, M. (1981). The relationship between one dimension of cognitive style and students' mathematics performance (Indiana University, 1980). DAI, 41, 4281A-4282A.

Taitt, N. (1986). The effect of computer programming instruction on the problem solving ability of pre-service elementary teachers (University of Illinois at Urbana-Champaign, 1985). DAI, 46, 1908A.

Tamburino, J. (1983). The effects of knowledge-based instruction on the abilities of primary grade children in arithmetic word problem solving. DAI, 43, 2943A. (University Microfilms No. 83-03,643)

Tartre, L. (1985). The role of spatial orientation skill in the solution of mathematics problems and associated sex-related differences (University of Wisconsin-Madison, 1984). DAI, 46, 94A-95A.

Thompson, E. (1968). Readability and accessory remarks: Factors in problem solving in arithmetic. DAI, 28, 2464A. (University Microfilms No. 67-17,547)

Tillotson, M. (1985). The effect of instruction in spatial visualization on spatial abilities and mathematical problem solving. DAI, 45, 2792A. (University Microfilms No. 84-29,285)

Treffinger, D. (1969). The effects of programmed instruction in productive thinking on verbal creativity and problem solving among pupils in grades four, five, six, and seven (Cornell University). DAI, 30, 1031A.

Truckson, E. (1983). The effects of heuristic teaching and instruction in problem-solving on the problem-solving performance, mathematics achievement, and attitudes of junior college arithmetic students (University of Cincinnati, 1982). DAI, 43, 3532A.

Tubb, G. (1975). Heuristic questionning and problem solving strategies in mathematics graduate teaching assistants and their students. DAI, 36, 235A-236A. (University Microfilms No. 75-15,077)

Tucker, B. (1975). A correlation study of three primary skills which contribute to arithmetic problem-solving ability among fourth-grade students (University of Illinois at Urbana-Champaign). DAI, 36, 2620A.

VanDeusen, R. (1980). The effects of humorous and personalized story problems on the achievement and attitudes of sixth grade students (University of Iowa). DAI, 41, 2487A-2488A.

Van Velsir, G. (1982). An exploratory study of problem solving characteristics in younger and older community college students (University of Maryland, 1981). DAI, 43, 134A.

Walter, J. (1985). A study of the effect of a pictorial representation approach to the teaching of Mathematical World [sic] problem solving to seventh grade students. DAI, 45, 2431A. (University Microfilms No. 84-24,076)

Wang, C. (1986). Mathematical problem solving memory (University of Southern California, 1985). DAI, 46, 2639A.

Welker, L. (1963). A study of interrelationships in arithmetical problem solving (University of Southern Mississippi, 1962). DAI, 23, 3750.

Versan, N. (1981). Utilizing a self-generated visual art strategy to facilitate proportional problem solving in mathematics. DAI, 42, 1447A. (University Microfilms No. 81-20,868)

West, C. (1985). Enhancing mathematics ability in sixth grade females via computer based graphics and problem solving (University of Southern California, 1984). DAI, 45, 1985A-1986A.

Westmoreland, J. (1975). First grade entrants' arithmetic problem-solving behavior as influenced by language variation and sex (Indiana University, 1974). DAI, 35, 5796A.

Wheeler, L. (1979). Syntactic complexity and its effect on written mathematical problems (University of Oklahoma). DAI, 39, 4186A.

Whitlock, P. (1974). An investigation of selected factors that affect ability to solve verbal mathematical problems at the primary level. DAI, 35, 1437A. (University Microfilms No. 74-19,713)

Williams, A. (1973). Teaching mathematical verbal problems to "middle ability" sixth grade readers with an inquiry method (Pennsylvania State University, 1972). DAI, 34, 1144A.

Wills, H., III. (1967). Transfer of problem solving ability gained through learning by discovery (University of Illinois). DAI, 28, 1319A.

Wilson, F. (1982). The effect of a model designed to facilitate mathematical story problem-solving skills in children in the intermediate elementary grades (Walden University). (ERIC Document Reproduction Service No. 223 446)

Wilson, J. (1968). Generality of heuristics as an instructional variable. DAI, 28, 2575A. (University Microfilms No. 67-17,526)

Wolfe, L. (1970). The effects of space visualization training on spatial ability and arithmetic achievement of junior high school students (State University of New York at Albany). DAI, 31, 2801A.

Wright, J. (1968). A study of children's performance on verbally stated problems containing word clues and omitting them. DAI, 29, 1770B. (University Microfilms No. 68-15,516)

Yen, F. (1986). An intervention study in mathematical problem solving among selected junior high school students. DAI, 46, 2244A-2245A. (University Microfilms No. 85-22,361)

Young, M. (1986). An investigation of the effects of problem-solving on the standardized test performance of high school students (University of Tennessee, 1985). DAI, 47, 159A.

Zalewski, C. (1978). An investigation of selected factors contributing to success in solving mathematical word problems (Boston University School of Education). DAI, 39, 2804A.

Zollman, A. (1987). Aspects of transfer of learning in mathematical problem solving with respect to the order of problem presentation (Indiana University, 1986). DAI, 47, 2936A-2937A.

Zweng, M. (1963). A study of the performance of second grade children on four kinds of division problems. Madison: University of Wisconsin.

ERIC Documents

Beardslee, E., & Jerman, M. (1973). Linguistic variables in verbal arithmetic problems. University Park: Pennsylvania State University. (ERIC Document Reproduction Service No. ED 073 926)

Berger, D., & Wilde, J. (1984, March). Solving algebra word problems. Paper presented at the Conference on Applied Cognitive Psychology, Claremont, CA. (ERIC Document Reproductive Service No. ED 242 550)

Blohm, P., & Wiebe, J. (1980, December). Effects of representation and organizational features of text on success in mathematical problem-solving. Paper presented at the annual meeting of the American Reading Conference, Sarasota, FL. (ERIC Document Reproduction Service No. ED 195 930)

Burns, R., & Lash, A. (1985). A look at math teachers and problem solving. San Francisco: Far West Lab. for Educational Research and Development. (ERIC Document Reproduction Service No. ED 273 463)

Carpenter, T., Fennema, E., Peterson, P., Chiang, C., & Loef, M. (1988, April). Using knowledge of children's mathematics thinking in classroom teaching: An experimental study. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA. (ERIC Document Reproduction Service No. ED 292 683)

Dalton, D. (1986, January). A comparison of the effects of LOGO use and teacher-directed problem-solving instruction on the

problem-solving skills, achievement, and attitudes of low, average, and high achieving junior high school learners. Paper presented at the annual convention of the Association for Educational Communications and Technology, Las Vegas, NE. (ERIC Document Reproduction Service No. ED 267 761)

De Corte, E., & Somers, R. (1981, March). Estimating the outcome of a task as a heuristic strategy in arithmetic problem solving: A teaching experiment with sixth-graders. Paper presented at the annual meeting of the American Educational Research Association, Los Angeles, CA. (ERIC Document Reproduction Service No. ED 202 693)

Good, T., & Grouws, D. (1979). Experimental study of mathematics instruction in elementary schools. Final report. Columbia: University of Missouri, College of Education. (ERIC Document Reproduction Service No. ED 219 262)

Harvin, V., & Gilchrist, M. (1970). Mathematics teacher--A reading teacher? South Bend: Indiana University School of Education. (ERIC Document Reproduction Service No. ED 041 702)

Henney, M. (1970, May). Improving mathematics verbal problem solving ability through reading instruction. Paper presented at the conference of the International Reading Association, Anaheim, CA. (ERIC Document Reproduction Service No. ED 044 243)

Hortin, J. (1985, January). Using imagery training to solve puzzles. Paper presented at the annual convention of the Association for Educational Communications and Technology, Anaheim, CA. (ERIC Document Reproduction Service No. ED 256 320)

Horwitz, L. (1981, April). Visualization and arithmetic problem solving. Paper presented at the annual meeting of the American Educational Research Association, Los Angeles, CA. (ERIC Document Reproduction Service NO. ED 202 695)

Lewis, J., & Hoover, H. (1981). The effect on pupil performance of using hand-held calculators on standardized mathematics achievement tests. (ERIC Document Reproduction Service No. ED 204 152)

Lindvall, C., Tamburino, J., & Robinson, L. (1982). An exploratory investigation of the effect of teaching primary grade children to use specific problem solving strategies in solving simple arithmetic problems. Paper presented at the annual meeting of the American Educational Research Association, New York. (ERIC Document Reproduction Service No. ED 216 904)

Loomer, N. (1980). A multidimensional exploratory investigation of small group heuristic and expository learning in calculus. In J. Harvey & T. Romberg (Eds.), Problem-solving studies in mathematics. Madison: University of Wisconsin, Research and Development Center for Individualized Schooling. (ERIC Document Reproduction Service No. ED 197 962)

Maher, C. (1982). Variables associated with problem-solving performance: The Rutgers University-Middlesex Public Schools Math Project. (ERIC Document Reproduction Service No. ED 218 092)

Marshall, S. (1982). Sex differences in solving story problems: A study of strategies and cognitive processes. Final report. Santa Barbara: University of California, Department of Psychology. (ERIC Document Reproduction Service No. ED 243 719)

Massey, A. (1986, May). The effects of using algebra notecards on algebra achievement of college students. Paper presented at the annual Education Colloquium, Pittsburgh, PA. (ERIC Document Reproduction Service No. ED 278 556)

Moses, B. (1979, April). The effects of spatial instruction on mathematical problem solving performance. Paper presented at the annual meeting of the American Educational Research Association, San Francisco. (ERIC Document Reproduction Service No. ED 176 941)

Moses, B. (1980, April). The relationship between visual thinking tasks and problem-solving performance. Paper presented at the annual meeting of the American Educational Research Association, Boston. (ERIC Document Reproduction Service No. ED 187 734)

Roman, R. (1975). The word problem program: Summative evaluation. Pittsburgh, PA: Pittsburgh University Learning Research and Development Center. (ERIC Document Reproduction Service No. ED 113 212)

Rosenthal, D., & Resnick, L. (1971, February). The sequence of information in arithmetic word problems. Paper presented at the meeting of the American Educational Research Association, New York. (ERIC Document Reproduction Service No. ED 049 909)

Schoen, H., Oehmke, T., & Tarr, J. (1980). The Iowa Problem-Solving Project: Development and evaluation. (ERIC Document Reproduction Service No. ED 199 052)

Schonberger, A. (1980). Sex, visual abilities, and problem solving. In J. Harvey & T. Romberg (Eds.), Problem-solving studies in

mathematics. Madison: University of Wisconsin, Research and Development Center for Individualized Schooling. (ERIC Document Reproduction Service No. ED 197 962)

Schonberger, A. (1982, March). Factors related to problem solving by college students in developmental algebra. Paper presented at the annual meeting of the American Educational Research Association, New York. (ERIC Document Reproduction Service No. ED 214 614)

Shores, J., & Underhill, R. (1976, April). An analysis of kindergarten and first grade children's addition and subtraction problem solving modeling and accuracy. Paper presented at the annual meeting of the American Educational Research Association, San Francisco. (ERIC Document Reproduction Service No. ED 121 626)

Skrypa, A. (1979). Effects of mathematical vocabulary training on problem solving ability of third- and fourth-graders. (ERIC Document Reproduction Service No. ED 172 169)

Sowder, L. (1988). Concept-driven strategies for solving problems in mathematics. Final project report. San Diego, CA: Center for Research in Mathematics and Science Education. (ERIC Document Reproduction Service No. ED 290 629)

Steffe, L. (1967). The effects of two variables on the problem-solving abilities of first-grade children. Report No. TR-21. Madison: University of Wisconsin, Research and Development Center for Cognitive Learning. (ERIC Document Reproduction Service No. ED 019 113)

Szetela, W., & Super, D. (1983). Calculators and strategies for problem solving in Grade 7: An implementation program and study. Report No. 83:3. Vancouver, British Columbia: Educational Research Institute of British Columbia, Vancouver. (ERIC Document Reproduction Service No. ED 228 036)

Talton, C. (1973). An investigation of selected mental, mathematical, reading, and personality assessments as predictors of high achievers in sixth grade mathematical verbal problem solving. (ERIC Document Reproduction Service No. ED 079 697)

Vaidya, S., Nasuti, P., & Rockhill, L. (1981, August). Field-dependence-independence and mathematics problem-solving. Paper presented at the annual meeting of the American Psychological Association, Los Angeles. (ERIC Document Reproduction Service No. ED 212 473)

Wearne, D. (1980). Development of a test of mathematical problem-solving which yields a comprehension, application, and problem-solving score. In J. Harvey & T. Romberg (Eds.), Problem-solving studies in mathematics. Madison: University of Wisconsin, Research and Development Center for Individualized Schooling. (ERIC Document Reproduction Service No. ED 197 962)

Whitaker, D. (1980). Relationships between selected noncognitive factors and the problem solving performance of fourth-grade children. In J. Harvey & T. Romberg (Eds.), Problem-solving studies in mathematics. Madison: University of Wisconsin, Research and Development Center for Individualized Schooling. (ERIC Document Reproduction Service No. ED 197 962)

Yancey, A. (1981, August). Pupil generated diagrams as a strategy for solving word problems in elementary mathematics. Thesis for Specialist in Education, University of Louisville, KY. (ERIC Document Reproduction Service No. ED 260 922)

Other Sources

Bettner, F. (1946). A study of the effects of sentence length in problem solving. Master's thesis, University of Iowa, Iowa City.

Cullen, T. (1962-1963). The effects of practice in the reading of arithmetic problems upon the achievement in arithmetic of third grade pupils. Master's thesis, Cardinal Stritch College, Milwaukee, WI.

Ettinger, M. (1984). The effect of tables on solving algebra problems. Master's thesis, Florida Atlantic University, Boca Raton.

Evans, J. (1950). A study of the effect of unfamiliar words in problem solving. Master's thesis, University of Iowa, Iowa City.

Kramer, G. (1933). The effect of certain factors in the verbal arithmetic problem upon children's success in the solution. Johns Hopkins University Studies in Education. Baltimore: The Johns Hopkins Press.

Lennon, R. (1937). The effect of verbal cues and irrelevant details in the statements of arithmetic problems upon children's attempted solutions. Master's thesis, Fordham University, New York.

Lutes, O. (1926). An evaluation of three techniques for improving ability to solve arithmetic problems. Monographs in Education, First Series, No. 6. Iowa City: University of Iowa.

Pearson, D. (1935). The effect of special emphasis in developing a student's ability to solve reasoning problems in algebra. Master's thesis, University of South Dakota, Vermillion.

Stretch, L. (1931). The relation of problem solving ability in arithmetic to comprehension in reading. Contributions to Education, No. 87. Nashville, TN: George Peabody College for Teachers.

Welch, R. (1950). The relative merits of two types of arithmetic problems. Master's thesis, University of Iowa, Iowa City.

Wheat, H. (1929). The relative merits of conventional and imaginative types of problems in arithmetic. Contributions to Education, No. 359. New York: Teachers College, Columbia University.